
ENVIRONMENTAL Fact Sheet



29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

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Performing a Business or Industry Water Use and Conservation Audit

Performing a water audit of your facility is the first step in designing an effective water conservation plan. A water audit surveys all water-using or conveying fixtures, plumbing, equipment and practices at a business or manufacturing facility to determine the present water uses, losses, and conservation practices and to recommend improvements. A water audit serves as the starting point for identifying losses and implementing useful water efficiency practices.

An audit for a large facility that uses vast quantities of water is a significant undertaking. You may want to obtain outside help from a consultant or your water utility. The following steps are designed as a general guide to the water audit process. Since this is a generic document, not all portions of the audit process will apply to your facility.

Step 1: Identify your source.

Where do you get your water? Is it from an offsite municipal supplier, an onsite community water supply, an onsite private water supply, a surface water body, or a combination?

Step 2: Gather all existing information including:

- Water and sewer bills.
- Maps, schematics, and floor plans of the distribution system, plumbing and equipment.
- Number of employees/occupants and their schedules. Does your facility have shifts covering the entire 24-hours? These factors make a difference in the magnitude of your water use.
- Capacities, storage and water use of all appliances, fixtures, pumps, hoses, rinse tanks, cooling towers, recycling ponds, and other water-using equipment and structures. You may have to call the manufacturer or installer to get this information.
- Any paperwork (owner's manuals) related to water-using equipment, appliances, fixtures, pumps, etc.

Step 3: Quantify your water use from each source.

If your business or facility is metered this task is easy. Calculate your water use based on a 24-hour period. Record the meter readings at the beginning and end of the 24 hours. Subtract the initial reading from the final one. This is how much water you used on that day. Do this several times and average the daily readings.

If you are not metered, you will need to estimate water use based on the use type and equipment you have, employees/occupant numbers, and information gathered in Step 2. You may also use a portable, non-invasive, ultrasonic water meter to measure flows at various points in the facility. This is a device that clamps onto the outside of pipes and, using ultrasound, measures water flow through the pipe. This equipment requires a pipe diameter of at least 1.5 inches and does not perform well on some PVC piping.

Step 4. Perform the Audit.

Where and how do you use your water?

- Catalog water-using devices and measure daily use of each. Note the number of each, the manufacturer and the amount of water each uses. Don't forget to include fixtures and practices employed in outside water use. For example: Three low-flush American Standard toilets at 1.6 gallons per flush each.
- For unmetered businesses and manufacturing facilities, estimate the 24-hour water use of each device. For instance, multiply the flow rate of a garden hose in gallons per minute times the number of minutes of use.
- Identify and quantify water losses due to leaks for each device. This can be as simple as comparing manufacturing specifications with meter readings. If the device uses more water than the manufacturer recommends, then there's a possible leak.
- Determine water consumption for each device. $\text{Consumption} = \text{water in} - \text{leaks} - (\text{waste})$ water out. For instance, consumption can be blow down, or the water used to make your product, such as concrete or bottled beverages, or the water left in linens after washing that is subsequently lost in the drying process.
- Identify and quantify water conservation devices and practices already in place. Quantify their water use and savings over conventional devices and methods.

Step 5. Analyze the Audit Results.

Water in from the source should equal wastewater out + consumption + losses.

- Compare measured water consumption of devices to the manufacturer's claims.
- Calculate the total amount of "lost" water for each device. This includes consumptive use plus leaks.
- Identify ways to locate and repair leaks.

Step 6. Develop a Forecast of Future Water Use.

Consider historical water demand, future expansion, employee/occupant increases or decreases, planned water conservation practices, retrofits and upgrades, and weather conditions and trends.

Step 7. Prepare a Benefit/Cost Analysis of Potential Water Conservation Measures.

- Calculate the cost of "lost" water identified in Step 5. Include consumptive use plus leaks. This cost could be either cost/gallon to buy water or cost per gallon to pump it. Include treatment and processing costs of lost water. Be sure to include wastewater disposal costs. If you know the wattage rating for your pump you can estimate cost of pumping water. Multiply the wattage times the number of hours a day the pump runs times the kilowatt-hour rate your electric company charges.

- Consider all costs associated with a proposed conservation measure including initial purchase and installation, administrative, maintenance, leak detection, repair and personnel.
- Determine the savings the new conservation measure will provide. Take into consideration savings due to leak repair. Calculate the cost savings of buying, pumping, treating, processing and heating water that would be used without the measure. Factor in the disposal costs of wastewater. Water efficiency practice implementation could also eliminate or reduce the need for water or sewer system expansions or replacements or infrastructure upgrades. Take avoided costs into consideration as well.
- Calculate a payback period for the proposed water efficiency measures. The payback period equals the time it takes to recover the initial expenditure of an installation or retrofit as a result of the savings associated with its use.

Step 8. Develop a Long-Range Water Conservation Plan.

Utilize your forecast and benefit/cost analysis to formulate your plan.

- State the goals of the plan and how water will be used in the future.
- Include a regular leak detection and repair program.
- Determine where and how you will replace or retrofit water efficiency devices.
- Determine which, where, and how water efficiency practices will be implemented.
- Document an implementation schedule for any proposed water efficiency practices and upgrades.
- Inaugurate employee or public education of the implemented practices and installed devices. Without the participants' buy-in and help, water efficiency practices will not work.

For Further Information

Contact Water Supply Engineering Bureau at 603-271-2513 or visit our website at www.des.state.nh.us/ws.htm

Environment Canada. Overview of water audits, how to measure domestic unmetered flows. www.on.ec.gc.ca/glimr/data/water-wise-pamphlets/audit-e.html

Utah State University Horticulture Dept. Landscaping water audit information. <http://www.hort.usu.edu/html/CWEL/CWELOverview.htm>

Reference:

____; *MIL-Handbook-1165, Water Conservation*; US Dept. of Defense; 1997
 Vickers, Amy; *Handbook of Water Use and Conservation*; WaterPlow Press, Amherst, MA; 2001